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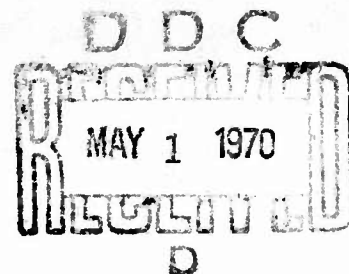
(Fluctuations in the Number of Whales of the
Chukchi Sea in Various Years).

by

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1970

ABSTRACT
(Conclusions on p. 64)

1. The total number of whales (fin whale, blue whale and minke whale) that occur in the Chukchi Sea during the summer-autumn period varies from one year to the other as a result of changing ice and food conditions. When the ice and food conditions are favorable, the number of baleen whales is considerable in the S and SE parts of the Chukchi Sea. The operation of the Aleut whaling fleet was successful at such times.
2. The presence of small cetaceans in the Bering Strait and the southern part of the Chukchi Sea enable our whalers to operate successfully from coastal stations, hunting the minke whales, killer whales and belugas.
3. The hunting of walrus must be forbidden due to its small population size. This will not endanger the livelihood of the local people. They can hunt small cetaceans and some of the large whales, such as fin whales and blue whales.

The author

FLUCTUATIONS IN THE NUMBER OF WHALES OF THE
CHUKCHI SEA IN VARIOUS YEARS

In the Chukchi Sea, the distribution of cetaceans in various years and seasons depends on ice conditions which are affected by the direction of wind and currents, especially during the warming and cooling of the Arctic basin. Various hydrological conditions in NW and SE parts of the sea, which depend on the general cooling of the former (NW part) and warming of the latter (SE part) by the Bering water, affect the distribution of vertebrates and invertebrates. In the NW part of the sea the arctic species prevail, but in the SE part the boreal species prevail. The latter grow up in mixed water (the cold Chukchi and warm Bering water). Under these conditions, the foraging areas feeding grounds usually consisting of zooplankton and various species of fishes lie in the SE part of the sea, less often in NW part.

The total number of whales in the feeding grounds of the Chukchi Sea is determined by the ice regime: in years when the ice concentrates in S and SE parts of the sea, the number of whales is smaller, but when the ice moves northward, the number of whales increases. Heavy concentrated ice obstructs the finding of food and breathing, whereas scattered ice facilitates the migration of whales northward (as far as the Wrangel and Herald Islands). In addition, the ice conditions affect the species composition of cetaceans: when the ice concentrates in the southern part of the sea, the number of killer whales and other species of the dolphin family decreases in the southern part of the Chukchi Sea.

Because systematic investigations of the hydrological regime and the development of plankton in the Chukchi Sea have not been carried out, the distribution of cetaceans in various sea regions is not so well known as in the Sea of Okhotsk, Sea of Japan and Bering Sea.

The data listed in the Sea Atlas show that southeasterly winds prevail in the Chukchi Sea in summer. Therefore, the arctic ice edge moves northward or northwestward (in August it usually runs along lat. 70°N). The more or less stable wind directions create favorable conditions for the migrations of cetaceans through ice-free water or areas with scattered ice floes and leads, thus reaching the Wrangel and Herald Islands and Cape Barrow. By the end of the summer and the beginning of autumn, the position of the arctic ice edge changes under the influence of currents and

northwesterly and northeasterly winds. In this case, the arctic ice edge approaches the Bering Strait. As a result, the ice-free area, leads and polynyas decrease, limiting the distribution of cetaceans in this basin. For example, we observed from aboard the whaling vessel Nazhim, large concentrations of ice in mys Serdtse-Kamen' sector at the beginning of September 1939, but in August the transport vessels could reach the Wrangel Island without difficulty. The northward movement of ice in summer creates large polynyas and open water. In some years only small areas of small floes remain in SW and SE parts of the Chukchi Sea. Under such favorable conditions the whales are widely distributed. In years when food conditions are excellent, large concentrations of whales are observed in this area. /55

Depending on hydrometeorological conditions, the whales leave the Chukchi Sea at the beginning, or middle, of October. The ice floes flowing southward obstruct the stay of whales in this sea. For a time they are observed near the Bering Strait, later they cross it, entering the Bering Sea.

According to whalers of the Nazhim, Kapitan Voronin and Kapitan Pospelov, concentrated ice floes were observed north of mys Dezhneva in the Chukchi Sea at the beginning of September 1938; there were large areas with open water through which whaling and transport vessels reached proliv Longa and Wrangel Island. At the beginning of September 1939, ice conditions were worse than in the preceding year; concentrated ice floes were encountered by the Nazhim north of mys Serdtse-Kamen'. Such a fluctuation of ice regime in the Chukchi Sea affects (together with other factors) the hydrological regime and the development of zooplankton associated with the regime. As in other seas, zooplankton constitutes the staple food for marine vertebrates inhabiting the Chukchi Sea. Zooplankton thrives in areas where cold and warm waters meet.

Let us examine the system of cold and warm currents of the Chukchi Sea (Fig. 1).

Cold and freshened water is observed in the western part of the Chukchi Sea. This water moves southeastward, reaching the Bering Strait and entering the northern part of the Bering Sea. The Bering Sea, on the other hand, flows into the southern part of the Chukchi Sea, moving eastward and westward.

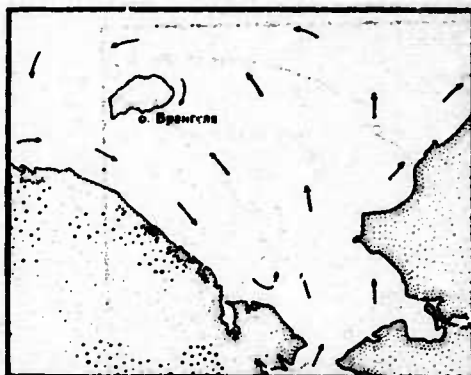


FIG. 1. Current System in the Chukchi Sea
(Taken from Sea Atlas)

The most detailed investigations of hydrological properties of the Chukchi Sea and the distribution of arctic and boreal forms of decapods are discussed by V. V. Makarov (1941). About 60% of the local decapods constitute arctic species and about 40% boreal species (their habitats are shown in Fig. 2).

Such a sharp boundary between the arctic and boreal forms is caused by the influx of the warm Bering water into the southern part of the Chukchi Sea. The northern boundary between the two groups of decapods is determined by the appearance of Sabinea septemcarinata, but the southern boundary of the arctic region by the distribution of Pandalus goniurus, Eualus suckleyi, Spirontocaris arcuata, etc. It runs from mys Vankarem in NE to the Herald Bank, then Cape Barrow, coinciding with the 0 isotherm of bottom water as well as with the position of arctic ice edge in August.

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The interface between cold and warm water, established by the distribution of arctic and boreal forms, is not constant: it changes due to the influx of Bering water. V. V. Makarov's (1941) viewpoint on the instability of interface between the cold and warm water is evidently associated with a periodic warming and cooling of the southern part of the Chukchi Sea. (Such a phenomenon is typical of the Far Eastern seas).

If the warming and cooling of other seas have been traced by the propagation of thermophilic fauna, the phenomena have not been sufficiently investigated in the Chukchi Sea. Similarly, the distribution of zooplankton, cephalopods and fishes that move in shoals in the Chukchi Sea is not well known.



FIG. 2. The Boundary of the Arctic Region (hatched area denoting the Arctic region, according to V. V. Makarov)

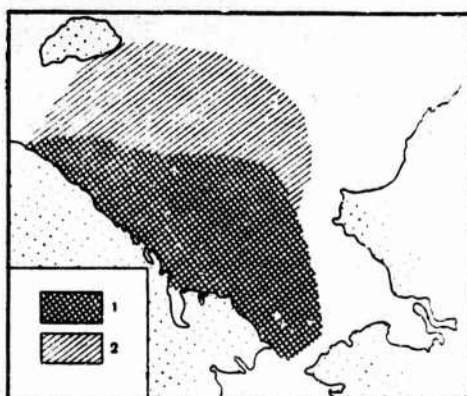


FIG. 3. Distribution of Edible Zooplankton in the Southwest Part of the Chukchi Sea

1--large zooplankton concentrations; 2--areas with periodic increases of zooplankton.

The Pacific water, substantially transformed in the Bering Sea, flows through the Bering Strait into the Chukchi Sea, namely in the northwestern direction as far as the Wrangel Island and along the northwest coast of Alaska. If in the summer no water temperature of the Chukchi Sea does not exceed 1.5°C, the inflowing Bering water has a temperature as high as 5°C.

The mixing of cold and warm water in the south and southwest parts of the Chukchi Sea create favorable conditions for the development of zooplankton (Fig. 3), whose biomass between the Bering Strait and m. Serdtse-Kamen's sector varied from 450 to 800mg/m³ at the beginning of September 1948, as evidenced by the writer's samples.

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The leading forms of edible zooplankton were Calanus cristatus and C. finmarchicus, which were followed by euphausiids, such as Thysanoessa rashi and Th. inermis. In addition, the development of Mysis oculata was noted; its biomass reached 1000mg/m³ in some stages.

The development and distribution of zooplankton in the Chukchi Sea have been little studied; and, therefore, the distribution of this grazing grounds in that basin can be gained only indirectly by the distribution of fishes that migrate in shoals, such as navaga and arctic cod, and by the bearded whales. Fluctuations in the number of whales in the Chukchi Sea, which were established by the whaling fleet Aleut in 1933-1936, and the observations of the writer in 1939 and 1948, disclose that the development and distribution of the edible zooplankton is very variable in this sea.

According to Soviet zoologists (B. A. Zenkovich, M. M. Sleptsov, A. G. Tomilin) and the observations of the whaling fleet Aleut and local inhabitants, the following cetaceans occur in the Chukchi Sea: Pacific form of Phocaena phocaena vomerina, Phocaenoides dalli, Delphinapterus leucas dorofeevi, Orcinus orca, Berardius bairdii*; in addition, the following species occur at times: Monodon monoceros, Balaena mysticetus, Rhachianectes glaucus, Balaenoptera acutorostrata, Balaenoptera borealis, Balaenoptera physalus, Sibbaldius musculus, Megaptera nodosa.

*The inclusion of P. bairdii into the cetacean fauna of the Chukchi Sea calls for indubitable facts (Editor. A. T.).

Delphinapterus leucas, B. mysticetus and, possibly, Monodon monoceros live more or less permanently in the Chukchi Sea. Others enter the sea only in summer. Those most often occurring include B. mysticetus, B. physalus, M. nodosa, B. acutorostrata. Evidently, B. borealis and S. musculus seldom occur in the Chukchi Sea. The latter has never been observed prior to 1948.

The available data on the distribution of cetaceans in the Chukchi Sea shows that the major part of species occupy mainly the southern half of the sea which is more often free of ice than the northern part. According to the Chukchi inhabitants, Eskimos and some of the investigators (Tomilin, 1937, 1937a; Nikulin, 1946; Sleptsov, 1948), the whales that enter the Chukchi Sea are concentrated for a while in the northern part of the Bering Sea and as the ice disappears from Bering Strait, the whales move north into the Chukchi Sea.

The migrations of cetaceans to the Chukchi Sea from the western areas of the Arctic Basin and from the Canadian Archipelago have been little studied. It is probable that under favorable ice conditions some species of cetaceans may travel these routes, namely the beluga and Greenland whale.

Several large-scale migrations of the Greenland whale are known to occur in some years. A. G. Tomilin (1957) cites Zordraguyer who reports the observation of the Greenland whale in Tatarskiy zaliv in 1723. Its back contained a harpoon thrown by Wilhelm Bastian, a Netherlands whaler, at the mammal in Spitsbergen region. According to Scorsby (1820), a Greenland whale, injured by Netherlands' whalers, was killed in the Bering Strait. A. G. Tomilin (1957) cites Harmer who had observed a dead Greenland whale on the coast of Kamchatka. Its body contained a harpoon of European whalers. Eshricht and Reinhard (1866) report on finding a dead Greenland whale at the estuary of Kolpakovo in Kamchatka. This whale had been harpooned in the North Atlantic Ocean. Tomilin (1957) cites E. I. Shereshevskiy who writes that in 1928 a dead Greenland whale with an American harpoon in its body was found on Novosibirskiye ostrova.

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These sightings of Greenland whales in the eastern hemisphere attest that whales may undertake distant migrations (from the Chukchi Sea to Tatarskiy zaliv) in years when the Arctic ameliorates. Not only the Greenland whale takes the northern route, but also belugas and narwhal. According to Yu. Simashko (1851) the latter was observed in the Chukchi Sea. At the present time this cetacean usually occurs in Franz Josef Land, Spitsbergen and Greenland regions.

The distribution of cetaceans in the Chukchi Sea and their summer and autumn migrations depend on the ice regime and the cold and warm currents which affect the development of zooplankton, concentration of Boreogadus saida and Eleginus navaga gracilis, i.e., the food of toothed and baleen whales.

The distribution of small cetaceans sometimes occurs in large numbers within the Chukchi Sea, especially in years when the arctic cods form large concentrations.

The Pacific Phocaena phocaena vomerina was first observed by the author at the beginning of September 1948, about 30 miles northeast of mys Uelen, 10 miles off o. Kolyuchin and 60 miles off Serdtse-Kamen'. These small dolphins traveled in small groups, 3 to 8 individuals in each. At that time, large schools of arctic cod were in the Chukchi Sea. The dolphins were evidently restricted to ice-free areas. Returning from the Chukchi Sea, these schools appeared near the Diomed Islands. The dolphins remained under water for about 1 1/2 mins. They then noisily appeared at the surface. For short distances, the movement speed of these dolphins was about 8-9 miles per hour, the maximum being 15 m.p.h. When searching for fishes, the dolphins did not jump out of the water. When reaching the surface, they made high crests of waves. Otherwise, they were very cautious and stayed away from our vessel.

Phocaenoides dalli was observed by us in 1948, from Bering Strait to mys Shmidt, near the Chukchi coast as well as in the open sea. The dolphins foraged in small pods, 4-6 individuals in each. In contrast to the preceding species, they approached our vessel, and sometimes even followed it for awhile. These dolphins were observed in open water only. Judging from their behavior, they hunted the arctic cod whose schools could be sighted from the ship. Off mys Serdtse-Kamen' we saw these dolphins at a distance of 2-3 miles from the coast and 1 mile from o. Kolyuchin. In the Bering Sea this mammal was observed near the Diomed Islands and mys Dezhnev (East Cape).

Nothing is known of the biology of Ph. dalli and Ph. ph. vomerina in the Chukchi Sea. Probably we will learn more about them when the hunting of small cetaceans is launched.

The beluga (Delphiaapterus leucos dorofeevi) that inhabits the Chukchi Sea has been only sporadically investigated. Most often it can be observed in the autumn, when the mammal migrates from the Chukchi to the Bering Sea, and in the spring and beginning of summer when it migrates into the Chukchi Sea. According to

P. G. Nikulin, 120 belugas were seen in the Bering Strait in May and June 1939.

Whalers report that beluga occurs among ice floes in proliv Longa near Wrangel Island, off the Chukchi coast from mys Dezhnev to Charenskaya guba. The total number of belugas in the Chukchi Sea evidently varies from year to year, though definite figures are not known. Beluga is not hunted in an organized way. The local inhabitants report that about 200 belugas are caught yearly near capes m. Dezhnev, Vankarna and Shidta.

The killer whale (Orcinus orca) is a constant visitor to the Chukchi Sea. In some years large numbers of the mammal are observed from the Bering Strait to the edge of the arctic ice. At the beginning of September 1948, we observed pods of killer whales from 5 to 30 individuals in each. They were in open water and large polynyas as well as among scattered ice floes near the resting grounds of male and female walruses. The behavior of the killer whales indicated that they hunted the arctic cod whose number was great in the area.

About 60 miles off mys Serdtse-Kamen', 30 killer whales were sighted by us. They traveled at a great speed and sometimes sprang up as high as 2 m. about the water surface. The presence of killer whales in the Chukchi Sea has been observed by B. A. Zenkovich (1939) during 1933-1936, and later by P. G. Nikulin (1946) and M. M. Sleptsov (1952). Great numbers of this species make it possible to organize special hunting to obtain technical facts, edible meat and valuable fur. In addition, the hunting reduces carnivores that eliminate the small pinnipeds and walruses.

Berardius bairdii seldom occurs and then only in small numbers in the Chukchi Sea. B. A. Zenkovich (1939) mentioned this mammal in the Chukchi Sea. At the beginning of September 1948, we observed two individuals of the species at a distance of 30 miles from mys Uelen. Their behavior suggested that they were hunting arctic cod. It is possible that this species has a wider distribution in the Chukchi Sea, but the needed data are lacking.

Narwhal (Monodon monoceros) is seldom seen in the Wrangel Island region, but we do not have detailed data on the distribution of this species in the Chukchi Sea.

The gray or Californian whale (Rhachianectes glaucus) belongs to the American pod. It spends winter near lower California and in the Gulf of California. In spring it travels north along the American coast, reaching the Gulf of Alaska, from where it travels west to the Aleutian Islands. The gray whale enters the Bering Sea via the straits between the islands and reaches the Bering Strait via the shallow northeast sector. Lastly, it enters the Chukchi Sea. These whales occupy the northwest part of the Chukchi Sea from the Bering Strait to mys Shmidt and Wrangel Island (Sleptsov, 1955). The gray whale inhabits the coastal belt with depths ranging from 4-5 to 20m, proliv Longa and Wrangel Island area where the depth does not exceed 60m. These mammals occur not only in ice-free sectors, but also in polynyas among ice and at the edge of arctic ice.

The concentrations of these whales varies from year to year, probably depending upon the benthic crustaceans. The gray whales usually form small pods (3-6 ind.), but sometimes they form pods consisting of 30-40 ind. or even 100-200 ind. Such large concentrations are observed in August and September, as pointed out by B. A. Zenkovich (1934, 1939), A. G. Tomilin (1937, 1937a), P. G. Nikulin (1946). Gray whales remain in Chukchi Sea to the end of October and in some years up to November. With the approach of heavy ice, the gray whales leave the Chukchi Sea via the Bering Strait. The yearly variation of gray whales in northwest and northeast parts of the Chukchi Sea has been little investigated. Their distribution off the Chukchi coast, where they occur more often, is better known.

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In contrast to other baleen whales, the gray whale feeds mainly on benthic crustaceans represented by genera Ampelisca, Anonyx, Lembos, Eusirus (Zenkovich, 1934; Tomilin, 1937, 1937a) and partly by Gammaridae species (Sleptsov, 1948). The local Chukchi and Eskimos that inhabit mys Dezhnev sector tell that in some years the whales appear in the Bering Strait by the end of April or the beginning of May. However, their usual arrival takes place by the end of May and the beginning of June. According to P. G. Nikulin (1946), the gray whale remains in the Chukchi Sea throughout the navigational period, from April through November.

Up to 1946, this whale was little hunted by the Soviet whalers. However, in some years the Aleut fleet did obtain several hundred gray whales. Since 1946, the hunting of this species has been forbidden by a decision of the International Convention. According to P. G. Nikulin, the total number of gray whales in the northern part of the Bering Sea and in the Bering Strait was 1904 ind. from June through September during 1937-1943. In August 1942, P. G.

Nikulin observed 1012 gray whales in Anadyrskiy zaliv and Bering Strait.*

Considering our poor knowledge of the distribution of gray whale, one can assume that by 1946, when the hunting of the species was outlawed, not less than 1500 gray whales inhabited the Chukchi and northwestern part of the Bering Sea.

From 24 August through 11 September 1948, the staff of whaling vessel Purga observed about 1200 gray whales in the northwestern part of the Bering Sea and in the Chukchi Sea.

According to whaler Olibash, the numbers of gray whales have increased two to three-fold in 1954 and 1955, in the area from bukhta Severnaya Glubokaya to Anadyrskiy zaliv. Without the definite data, it can be assumed, however, that the number of gray whales has doubled, reaching about 2500-3000 ind. at this time.

Since the number of gray whales is limited in the northern part of the Pacific Ocean, the increase in local hunting activity should be discouraged.

The Greenland whale (Elaena mysticetus). By interviewing Chukchis and Eskimos that live in mys Dezhnev's region and by consulting data by P. G. Nikulin (1946), it appears that in April the Greenland whales leave the northern part of the Bering Sea (which they inhabit in winter) and enter the Chukchi Sea. As the ice moves northward, they spread along the arctic ice edge among polynyas and pools of open water. Judging by commercial records of XVIII and XIX centuries, the Greenland whales were obtained in areas from the Bering Strait to Wrangel Island and Point Barrow. In the western half of the Chukchi Sea, the Greenland whale occurs from the Bering Strait to proliv Longa, Wrangel and Herald Islands. Because of intensive and unrestricted hunting of Greenland whales in XIX and at the beginning of XX centuries, their numbers are still small, although hunting of the whales by the local inhabitants of the Chukchi and Alaska peninsulas is limited (up to 10 a year, according to Tomilin, 1937) and outlawed by means of whaling vessels.

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*The numbers are evidently exaggerated as can be seen by comparing these data with systematic records of gray whales observed on the small feeding grounds (Russian editor, A. T.).

Due to a low reproduction rate the existing populations are increasing at a slow rate. Therefore, the hunting of Greenland whale should also be forbidden during the next decade. Regrettably, the whales hunted by Eskimos and Chukchi are not studied by zoologists, and, therefore, the valuable biological data on the whale remain unknown.

It happens that in some years the Greenland whales are caught by heavy pack ice in various gulfs of the Chukchi Peninsula. The whales cannot return to the sea through such ice. The mass mortality of Greenland whales in Karaginskiy zaliv in 1932, is widely known.

There are good prospects for the investigation of marine mammals in the Chukchi Sea. It is, therefore, hoped that in the immediate future many problems concerning the distribution of the mammals in the summer-autumn period will be clarified and the investigation of Greenland whales obtained by the Chukchi will be undertaken.

Balaenoptera acutorostrata occurs from Bering Strait to the ice edge. It is observed in the coastal belt of the northern and northwestern coast of the Chukchi Peninsula as well as in the open parts of the sea. At the beginning of September 1948, the author observed B. acutorostrata in polynyas among ice floes about 120 miles northeast of mys Dezhnev. In the mys Serdtse-Kamen' region, small individuals of the species were chasing a school of arctic cod. The population of this species is small in the Chukchi Sea during the first year of hunting. The whaling fleet Aleut obtained only about 15 B. acutorostrata in the Chukchi Sea (Tomilin, 1937). However, in some years their numbers increase above the average value. According to observations by P. G. Nikulin (1946), for example, only in August 1939, 70 species of the whales were observed in the Bering Strait; but at the beginning of September 1948, the writer noticed from aboard the Purga 65 B. acutorostrata between the Bering Strait and the village of Vankar (as to the population size, this species prevailed over other baleen whales in 1948).

This species can be successfully hunted (not less than 50 a year) in the Chukchi Sea with small harpoon cannons. Its fat is delicious.

The Sei whale (Balaenoptera borealis) occurs only occasionally in the Chukchi Sea, usually near the Bering Strait. We did not observe this species north of the area, neither in 1939 nor in 1948.

The Fin whale (B. physalus) is one of the numerous baleen whales that inhabit the Chukchi Sea (Zenkovich, 1936; Tomilin, 1937). This species occurs from the Bering Strait to the arctic ice edge, in coastal zone as well as in the open sea. It migrates northwest as far as proliv Longa, Wrangel and Herald Islands, and prefers areas free of ice, but also occurs in pools of open water among ice floes.

From 1933 to 1935, the whaling fleet Aleut obtained Fin whales near the Chukchi coast between mys Dczhněva and mys Serdtse-Kamen'. This was a favorable area for hunting whales because the Aleut was not well suited for work among ice.

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Because of changing ice conditions and the quantity of zooplankton, the numbers of Fin whales change from year to year. Thus, for example, at the beginning of September 1939, we observed a pod of about 90 Fin whales from aboard the Nazhim in the mys Serdtse-Kamen' area. In six days as many as 320 Fin whales were observed. But when we investigated the whales from aboard Purga at the beginning of September 1948, only 12 Fin whales could be sighted from Bering Strait to the village of Vankar.

The greatest size of the Fin whale population is reached in years when zooplankton is abundant, especially Thysanoessa inermis, Thrashii and Mysis oculata. In addition to zooplankton, the Fin whale consumes arctic cod. In 1948, we observed the whales among schools of cods.

The Blue whale (Sibbaldius musculus) was not observed by B. A. Zenkovich, A. G. Tomilin and Kellog in the Chukchi Sea. We, however, encountered about 80 Blue whales at the beginning of September 1939, when the whaling vessel Hazhim cruised the Chukchi Sea from the Bering Strait to mys Serdtse-Kamen'. They occurred in pods from 2 to 20 ind. At the beginning of September 1948, however, we observed only 2 Blue whales from aboard Purga when cruising from the Bering Strait to the village of Vankar. These whales were not shy, they admitted us as close as 10 to 20m. They seemed to feed on zooplankton.

The Blue whales avoided the pods of Humpback whales and Fin whales. P. G. Nikulin did not notice the passage of Blue whales through the Bering Strait. Probably the reason is that the observations were conducted from the coast and it is difficult to distinguish Blue whales from Fin whales at a great distance. It is evident that the sojourn of Blue whales in the Chukchi Sea differs in dates and length of stay from that of other whales. It is known that this species does not shun ice. It occurs at

the ice edge as well as among ice floes. It is possible that in the Chukchi Sea it forages along the edge of the arctic ice. However, definite data on such behavior are still lacking. According to reports by whalers, in August and September 1954, Blue whales occurred among ice floes north east of mys Shmidt.

Judging by the size of observed whales, the Chukchi Sea is entered by sexually mature and immature whales, as well as by females with young.

Thus, it appears that the Blue whale occurs not only in the northern part of the Bering Sea, but also in the Chukchi Sea.

According to data on the hunting of whales in the Chukchi Sea (Tomilin, 1937; Zenkovich, 1939), the observations of zoologists and their appraisals of whale population sizes (Nikulin, 1946; Sleptsov, 1948), the numbers of Blue whales change from one year to another. B. A. Zenkovich reports that in September 1933, the whaling fleet Aleut operated between m. Dezhnev and m. Serdtse-Kamen'. At that time, Fin whales, Humpback whales and Gray whales prevailed, the latter occurring in pods as large as 200 ind. The whale concentration was obviously indicated by the thriving zooplankton. In August and September 1933, a wide reddish brown belt of water, teeming with zooplankton, was observed west and northwest of m. Serdtse-Kamen'. The zooplankton attracted schools of the arctic cod and navaga. Judging by the records of the whaling fleet Aleut, the number of whales was rather small in Chukchi Sea in 1934 and 1935.

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Hydrometeorological conditions in the summer and autumn evidently played a decisive role in the development of zooplankton and the concentration of whales in 1939, and the poor development of plankton with absence of whales in 1948. In August and September 1936, baleen whales were successfully hunted in the Chukchi Sea by the Aleut. At places, according to B. A. Zenkovich, the pods contained as many as 100 individuals.

The most thorough evaluation of the population sizes of whales in the Chukchi Sea was made by P. G. Nikulin (1946) during 1937-1943. He observed the whales from shore stations, thus, however, limited the prospects of counting the numbers of whales and their identification to the species, yet collected enough data to attest to fluctuations in the number of whales in the summer and autumn seasons. Thus, from July through October 1937, 233 Humpback whales, 177 Fin whales, 230 Gray whales and one Greenland whale were noted between the Bering Strait and m. Serdtse-Kamen'; from June through October 1938, Nikulin observed 47 Fin whales, 121

Gray whales, 60 Humpback whales, 17 Killer whales and 4 Minke whales in the Chukchi Sea between the Bering Strait, village of Metkulen and mys Intsova. From April through October 1939, the same area was investigated where Nikulin observed 107 Gray whales, 93 Fin whales, 77 Minke whales, 45 Humpback whales, 16 Killer whales and 4 Greenland whales, but in August and September 1940, he observed 14 Fin whales and 143 Gray whales. In August and September 1941, Nikulin investigated the area between Anadyrskiy zaliv and the Bering Strait. He saw 5 Fin whales, 136 Gray whales, 51 Humpback whales, 90 Killer whales and 13 Minke whales. The greatest number of whales was observed by him in August 1942, between the Bering Strait and Anadyrskiy zaliv, namely, 164 Fin whales, 1012 Gray whales, 122 Humpback whales and 110 Killer whales; whereas in August 1943, only 19 Humpback whales and 13 Gray whales were noticed.

A considerable number of the whales observed by Nikulin were not identified because of the great distance and bad weather. But this circumstance does not change the general concept of the number of whales that enter the Chukchi Sea. During seven years Nikulin observed 4704 whales.

We evaluated the number of whales in Chukchi Sea and Bering Strait in 1939 from aboard Nazhim and in 1948 from aboard Purga. From 1 to 7 September 1939, the area between the Bering Strait and m. Serdtse-Kamen' was surveyed. The result: 320 Fin whales, 80 Blue whales, 100 Humpback whales, 35 Minke whales and 125 Gray whales. The collected zooplankton samples disclosed that the organisms thrived in the area, notably, crustaceans represented mainly by euphausiids and copepods.

From 28 August through 12 September 1948, when the area from Bering Strait to mys Shmidta was surveyed, we observed 12 Fin whales, 2 Blue whales, 20 Humpback whales, 35 Gray whales, 55 Killer whales, 30 porpoises, 50 White porpoises, 65 Minke whales and 2 Baird's Beaked whales.

Despite certain limitations, the observation results disclose that the number of whales that enter the Chukchi Sea is considerable. However, to elucidate the distribution pattern of whales in the Chukchi Sea during the summer-autumn period, a more thorough survey from vessels and helicopters should be made. It is also necessary to investigate food resources, the hydrological regime, the peaks of zooplankton biomass and fish concentrations in this region.

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13. ABSTRACT 1. The total number of whales (fin whale, blue whale and minke whale) that occur in the Chukchi Sea during the summer-autumn period varies from one year to the other as a result of changing ice and food conditions. When the ice and food conditions are favorable, the number of baleen whales is considerable in the S and SE parts of the Chukchi Sea. The operation of the Aleut whaling fleet was successful at such times. 2. The presence of small cetaceans in the Bering Strait and the southern part of the Chukchi Sea enable our whalers to operate successfully from coastal stations, hunting the minke whales, killer whales and belugas. 3. The hunting of walrus must be forbidden due to its small population size. This will not endanger the livelihood of the local people. They can hunt small cetaceans and some of the large whales, such as fin whales and blue whales. Translator			

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